

# PATENT ABSTRACTS OF JAPAN

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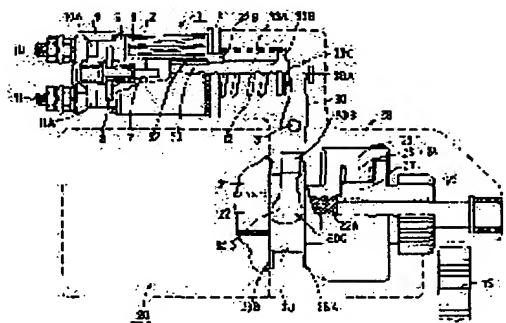
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## (54) STARTER

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To reduce the number of parts and to facilitate the assembling work by fitting a coil spring with an end part of the coil spring abutted on a coil spring receiving plate part, and engaging a fork-shaped head part formed on an upper end of a pinion shift lever with a pinion shift lever engagement part.

**SOLUTION:** A recessed groove 33A to be fitted to a projected part 32B formed on an inner circumference of a through hole in a coil bobbin 32 is formed on an outer circumference of a moving core 33 to be fitted to a through hole of the coil bobbin 32, and a pinion shift lever engagement part 33C is integrated therewith. An end part of the coil spring 12 is abutted on a coil spring receiving plate part 33B, and the coil spring 12 is fitted between a front cover 5 of an engage switch 1 and the coil spring receiving plate part. In addition, a fork-shaped head part 30A formed on an upper end of a pinion shift lever 30 is engaged with the pinion shift lever engagement part 33C. The number of parts is reduced, and the assembling work is facilitated.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] In the starter which has the engage switch with which the pinion case was equipped, and a pinion shift lever. Heights are formed in the inner circumference of the breakthrough formed in the center of a coil bobbin of this engage switch. While forming the concave which fits into the heights formed in the inner circumference of the aforementioned coil bobbin breakthrough free [ sliding ] in the periphery of MUBINGUKOA with which the breakthrough of this coil bobbin is equipped free [ sliding ] Form the coil spring supporting-plate section and the pinion shift-lever engagement section in one, and while equipping with this coil spring in contact with this coil spring supporting-plate section, the edge of a coil spring the two forks formed in this pinion shift-lever engagement section at the upper limit of a pinion shift lever -- the starter characterized by engaging the \*\* head

[Claim 2] In order to engage a pinion to the starter ring of an engine in the starter which has the engage switch with which the pinion case was equipped, and a pinion shift lever, The contact section of the \*\* leg is formed almost circularly. the two forks formed in the flange by the side of the pinion of the pinion shifter which carries out press contact, and the lower part of a pinion shift lever -- the contact section with the \*\* leg will be in a point-contact state mostly -- as -- this -- two forks -- the two forks formed in the flange by the side of the motor of the aforementioned pinion shifter which carries out press contact in order to secede from a pinion from the aforementioned link gear, and the lower part of a pinion shift lever -- the contact section with the \*\* leg serves as field contact mostly -- as -- this -- two forks -- the starter characterized by forming the contact section of the \*\* leg in the shape of a straight line mostly

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

## [0001]

[The technical field to which invention belongs] this invention relates to the starter which has especially an engage switch and a pinion shift lever about the starter which puts engines, such as an automobile, into operation.

## [0002]

[Description of the Prior Art] The engage switch and pinion shift lever of a starter which are generally used conventionally are shown in drawing 9 and drawing 10. In this drawing, 1 is an engage switch and this engage switch 1 consists of a yoke 2, a coil 3, the coil bobbin 4, a front cover 5, the stationery core 6, a plunger 7, a traveling contact 8, the switch housing 9, stationary contacts 10A and 11A and the terminals 10 and 11 formed in one, a coil spring 12, MUBINGUKOA 50, a spring supporting plate 51, and a retaining clip 52.

[0003] As above-mentioned MUBINGUKOA 50 is shown in drawing 11 and drawing 12, it consists of major-diameter section 50A and narrow diameter portion 50B, and disc-like section 50C, plate-like section 50D, and annular concave 50E are formed in the front end section of the narrow diameter portion 50B.

[0004] And by attaching in concave 50E of this MUBINGUKOA 50 the retaining clip 52 shown in drawing 15 and drawing 16, it is equipped with the spring supporting plate 51 shown in drawing 13 and drawing 14, and as this shows drawing 9, it is equipped with the coil spring 12 between this spring supporting plate 51 and the front cover 5.

[0005] next, the two forks which 60 is a pinion shift lever, it was equipped with this pinion shift lever 60 in drawing 9 and drawing 10 so that the pin shaft 61 might be rotated as a center in the pinion case of the starter which is not illustrated, and were formed in the upper-limit section -- \*\* head 60A is being engaged so that plate-like section 50D of aforementioned MUBINGUKOA 50 may be inserted and the two forks formed in the soffit section -- \*\* leg 60B is equipped with the roller 63 free [ rotation ] by the roller pin 62 which fixed with caulking etc.

[0006] Then, by the closed circuit of the starting switch which is not illustrated, if direct current voltage is impressed to a coil 3 While MUBINGUKOA 50 is attracted by the left of drawing 9, the pinion shift lever 60 rotates the pin shaft 61 as a center by this and the pinion of the starter which is not illustrated meshes the starter ring of an engine A traveling contact 8 contacts stationary contacts 10A and 11A, thereby, direct current voltage is impressed to the motor section of the starter which is not illustrated, this motor rotates with might and main, and an engine is started.

[0007] After starting of the engine, if the open circuit of the aforementioned starting switch is carried out, since the suction force of the aforementioned coil 3 will be lost, with the elasticity of the coil spring 12 of a compression state, MUBINGUKOA 50 and the pinion shift lever 60 return to the original position shown in drawing 9, and stop.

## [0008]

[Problem(s) to be Solved by the Invention] Since the end face of the coil spring 12 with which MUBINGUKOA 50 of an engage switch 1 was equipped was fixed and the spring supporting plate 51 was fixed by preparing annular concave 50E in MUBINGUKOA 50, and attaching the retaining clip 52 in this concave 50E conventionally, while there were many part mark, there was a fault that the attachment work was troublesome.

[0009] moreover, the two forks formed in the pinion shift lever 60 at both sides of plate-like section 50D formed at the nose of cam of MUBINGUKOA 50 in order to prevent rotation by vibration of MUBINGUKOA 50 etc. -- although it is made to insert by \*\* head 60A, since it had to form with troublesome milling etc., the processing of the plate-like section 50D was complicated, and it had the fault which becomes expensive [ a manufacturing cost ]

[0010] furthermore, the two forks of the pinion shift lever 60 -- since it had equipped with the roller 63 by fixing the roller pin 62 with caulking etc. to \*\* leg 60B, while there were many part mark, there was a fault that the work of caulking of the roller pin 62 etc. was troublesome

[0011] It aims at offering the starter which has the engage switch which can make a manufacturing cost cheap, and a pinion shift lever by reducing a processing man day while this invention was made in order to solve the above-

mentioned fault, and it reduces part mark.

[0012]

[Means for Solving the Problem] In the starter which has the engage switch by which the pinion case was equipped with the means concerning the claim 1 of this invention, and a pinion shift lever Heights are formed in the inner circumference of the breakthrough formed in the center of a coil bobbin of this engage switch. While forming the concave which fits into the heights formed in the inner circumference of the aforementioned coil bobbin breakthrough free [ sliding ] in the periphery of MUBINGUKOA with which the breakthrough of this coil bobbin is equipped free [ sliding ] Form the coil spring supporting-plate section and the pinion shift-lever engagement section in one, and while equipping with this coil spring in contact with this coil spring supporting-plate section, the edge of a coil spring the two forks formed in this pinion shift-lever engagement section at the upper limit of a pinion shift lever -- it is characterized by engaging the \*\* head

[0013] In order that the means concerning the claim 2 of this invention may engage a pinion to the starter ring of an engine in the starter which has the engage switch with which the pinion case was equipped, and a pinion shift lever, The contact section of the \*\* leg is formed almost circularly. the two forks formed in the flange by the side of the pinion of the pinion shifter which carries out press contact, and the lower part of a pinion shift lever -- the contact section with the \*\* leg will be in a point-contact state mostly -- as -- this -- two forks -- the two forks formed in the flange by the side of the motor of the aforementioned pinion shifter which carries out press contact in order to secede from a pinion from the aforementioned link gear, and the lower part of a pinion shift lever -- the contact section with the \*\* leg serves as field contact mostly -- as -- this -- two forks -- it is characterized by forming the contact section of the \*\* leg in the shape of a straight line mostly

[0014]

[Embodiments of the Invention] The front view of MUBINGUKOA of the coil bobbin with which cross-section outline front view, drawing 2, and drawing 3 are used for drawing 1 in part by which cross-section front view and a right lateral view, drawing 4, drawing 5, and drawing 6 are used in part for drawing 1, left lateral view and plan of the whole starter equipped with the engage switch and pinion shift lever of a starter of this invention 1 example, as for drawing 1, drawing 7, and drawing 8 are the front view and the right lateral views showing the engagement state of this MUBINGUKOA and a pinion shift lever.

[0015] In drawing 1, what is shown by the same number as drawing 9 shows the same thing. For the motor section of a starter, and 21, as for the axis of rotation and 23, the center bearing bracket of the motor section 20 and 22 are [ 19 / the link gear of an engine, and 20 / a pinion and 24 ] clutches, and this clutch 24 is constituted by the clutch outer 25 which fitted into helical spline 22A formed in the axis of rotation 22 free [ sliding ], and the clutch roller 26, a pinion 23 and the clutch inner 27 formed in one.

[0016] 28 is the pinion shifter which fixed to the clutch outer 25, and, as for this pinion shifter 28, flange 28A by the side of a pinion and flange 28B by the side of a motor are formed. 29 is the pinion case with which the aforementioned motor section was equipped, and it is equipped with this pinion case 29 so that the pinion shift lever 30 may rotate the pin shaft 31 as a center while the engage switch 1 has fixed.

[0017] As shown in drawing 2 and drawing 3, heights 32B is formed in the inner circumference of breakthrough 32A formed in the center of the coil bobbin 32 of an engage switch 1. and on the periphery of MUBINGUKOA 33 with which breakthrough 32A of this coil bobbin 32 is equipped free [ sliding ] As shown in drawing 4 or drawing 6, while forming concave 33A which fits into heights 32B formed in the inner circumference of breakthrough 32A of the aforementioned coil bobbin 32 free [ sliding ] Pinion shift-lever engagement section 33C which consists of coil spring supporting-plate section 33B, minor diameter pillar section 33D, and disc-like section 33E is formed in one, and contacts this coil spring supporting-plate section 33B in the edge of a coil spring 12. the two forks formed in this pinion shift-lever engagement section 33C at the upper limit of the pinion shift lever 30 while equipping with this coil spring 12 between the front covers 5 of an engage switch 1 -- \*\* head 30A is being engaged

[0018] below, it is shown in the soffit section of the aforementioned pinion shift lever 30 at drawing 7 and drawing 8 -- as -- two forks, although \*\* leg 30B is formed As shown in drawing 1, the contact section of flange 28A by the side of the pinion of the pinion shifter 28 it becomes a point contact mostly -- as -- the two forks -- while forming circularly contact section 30C of \*\* leg 30B, the contact section of flange 28B by the side of the motor of the pinion shifter 28 serves as field contact mostly -- as -- the two forks -- contact section 30D of \*\* leg 30B is mostly formed in the shape of a straight line

[0019] MUBINGUKOA 33 will be attracted by the left, if a deer is carried out, the closed circuit of the starting switch which will not be probably illustrated if operation of the starter shown in drawing 1 is explained is carried out and direct current voltage is impressed to a coil 3. by this The pinion shift lever 30 rotates the pin shaft 31 as a center. The pinion shifter 28, While a pinion 23 is moved to the method of the right through a clutch 24 and this pinion 23 meshes

the link gear 19 of an engine. Thereby, the traveling contact 8 of an engage switch 1 contacts stationary contacts 10A and 11A, and direct current voltage is impressed to the motor section 20 from the battery which is not illustrated, and the motor section 20 rotates with might and main, and starts an engine.

[0020] in this case, the two forks of the pinion shift lever 30 -- although almost circular contact section 30C formed in the lower part of \*\* leg 30B will be in flange 28A by the side of the pinion of the pinion shifter 28 under rotation, and a press contact state, since the contact section 30C is a point contact mostly, the contact resistance is remarkably small

[0021] Next, after starting of an engine, if the open circuit of the aforementioned starting switch is carried out, since the suction force of the aforementioned coil 3 will be lost, with the elasticity of the coil spring 12 of a compression state, MUBINGUKOA 33, the pinion shift lever 30, the pinion shifter 28, and a clutch 24 and a pinion 23 return to the original position shown in drawing 1, and stop.

[0022] in this case, the two forks of the pinion shift lever 30 -- it formed in the soffit section of \*\* leg 30B -- although flange 28B by the side of the motor of the pinion shifter 28 under rotation will be in a press contact state, since, as for the contact section 30D, straight-line-like contact section 30D is a line contact mostly, contact resistance serves as size sharply from the case of the aforementioned point contact, and it acts so that rotation of the axis of rotation 22 may be decelerated

[0023] And if flange 28B by the side of the motor of the pinion shifter 28 carries out press contact at the side of the center bearing bracket 21 of the motor section 20 as shown in drawing 1, since the contact resistance is size remarkably, in this, rotation of the axis of rotation 22 will stop quickly.

[0024] [Effect of the Invention] Since the spring supporting-plate section and the pinion shift-lever engagement section were formed in one while forming the crevice which fits into the heights formed in the inner circumference of the breakthrough which formed heights in the inner circumference of the breakthrough formed in the center of a coil bobbin of an engage switch so that clearly by the above explanation, and was formed in the aforementioned center of a coil bobbin at the periphery of MUBINGUKOA free [ sliding ], part mark become fewer and attachment work becomes easy.

[0025] And with milling with complicated processing etc., in order that conventional MUBINGUKOA may prevent rotation by vibration etc., although the plane section was formed in the point of MUBINGUKOA, since it becomes completely unnecessary [ this plane section ], processing becomes remarkably easy at it.

[0026] furthermore, the two forks formed in the lower part of a pinion shift lever -- a manufacturing cost can be made sharply cheap, while part mark decrease, since the roller pin and roller with which the \*\* leg was equipped conventionally were made unnecessary

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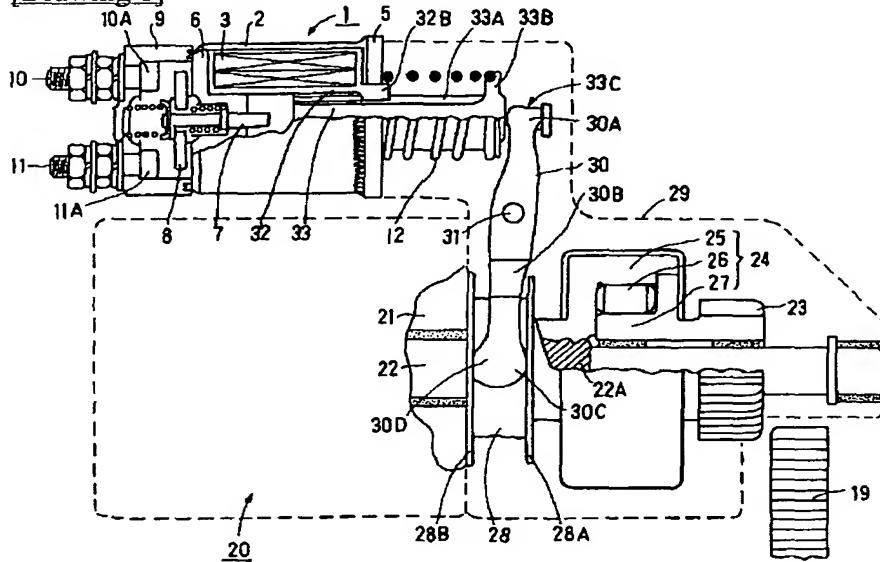
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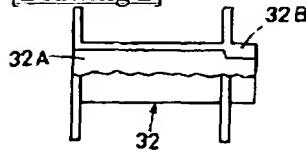
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## DRAWINGS

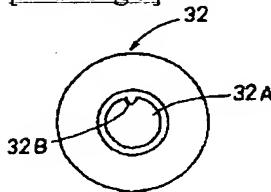
[Drawing 1]



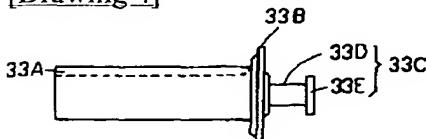
[Drawing 2]



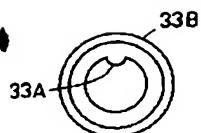
[Drawing 3]



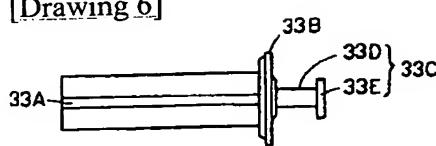
[Drawing 4]



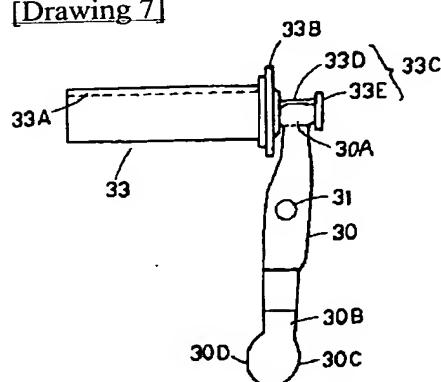
[Drawing 5]



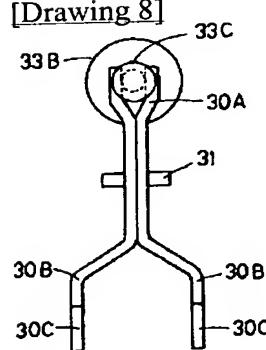
[Drawing 6]



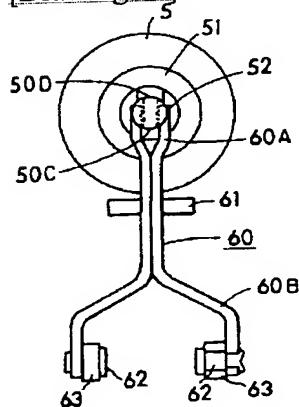
[Drawing 7]



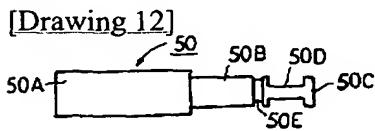
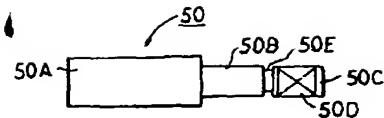
[Drawing 8]



[Drawing 10]



[Drawing 11]



[Drawing 13]



[Drawing 14]



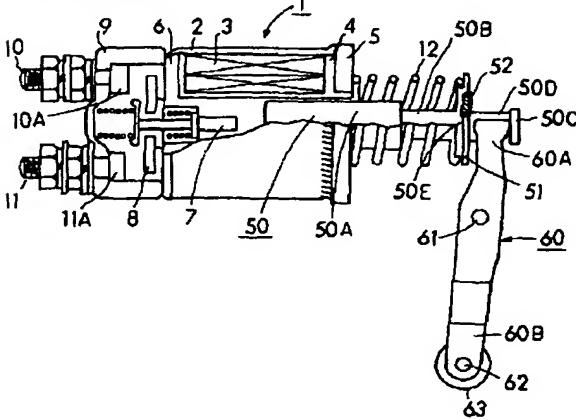
[Drawing 15]



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[Drawing 9]



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